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10/568,477	02/15/2006	Joerg Bredno	DE 030376	2375

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EXAMINER	
KOPCHIK, STEPHEN W	
ART UNIT	PAPER NUMBER
4154	
MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/568,477	BREDNO ET AL.	
	Examiner	Art Unit	
	STEPHEN KOPCHIK	4154	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *2/15/06*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☒ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *7/25/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Should applicant desire to obtain the benefit of foreign priority under 35 U.S.C. 119(a)-(d) prior to declaration of an interference, a certified English translation of the foreign application must be submitted in reply to this action. 37 CFR 41.154(b) and 41.202(e).

Failure to provide a certified translation may result in no benefit being accorded for the non-English application.

Specification

2. The disclosure is objected to because of the following informalities: The applicant does not clearly enumerate the beginning of each subsection of the specification. The examiner requests correction to avoid any confusion in the future. Please see below for the standards for arrangement and content of the specification.

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

(a) TITLE OF THE INVENTION.
(b) CROSS-REFERENCE TO RELATED APPLICATIONS.
(c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
(d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.

(e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.

(f) BACKGROUND OF THE INVENTION.
(1) Field of the Invention.
(2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.

(g) BRIEF SUMMARY OF THE INVENTION.

(h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).

(i) DETAILED DESCRIPTION OF THE INVENTION.

(j) CLAIM OR CLAIMS (commencing on a separate sheet).

(k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).

(l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

Content of Specification

(a) Title of the Invention: See 37 CFR 1.72(a) and MPEP § 606. The title of the invention should be placed at the top of the first page of the specification unless the title is provided in an application data sheet. The title of the invention should be brief but technically accurate and descriptive, preferably from two to seven words may not contain more than 500 characters.

(b) Cross-References to Related Applications: See 37 CFR 1.78 and MPEP § 201.11.

(c) Statement Regarding Federally Sponsored Research and Development: See MPEP § 310.

(d) The Names Of The Parties To A Joint Research Agreement: See 37 CFR 1.71(g).

(e) Incorporation-By-Reference Of Material Submitted On a Compact Disc: The specification is required to include an incorporation-by-reference of electronic documents that are to become part of the permanent United States Patent and Trademark Office records in the file of a patent application. See 37 CFR 1.52(e) and MPEP § 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text were permitted as electronic documents on compact discs beginning on September 8, 2000.

(f) Background of the Invention: See MPEP § 608.01(c). The specification should set forth the Background of the Invention in two parts:

(1) Field of the Invention: A statement of the field of art to which the invention pertains. This statement may include a paraphrasing of the applicable U.S. patent classification definitions of the subject matter of the claimed invention. This item may also be titled "Technical Field."

(2) Description of the Related Art including information disclosed under 37 CFR 1.97 and 37 CFR 1.98: A description of the related art known to the applicant and including, if applicable, references to specific related art and problems involved in the prior art which are solved by the applicant's invention. This item may also be titled "Background Art."

(g) Brief Summary of the Invention: See MPEP § 608.01(d). A brief summary or general statement of the invention as set forth in 37 CFR 1.73. The summary is separate and distinct from the abstract and is directed toward the invention rather than the disclosure as a whole. The summary may point out the advantages of the invention or how it solves problems previously existent in the prior art (and preferably indicated in the Background of the Invention). In chemical cases it should point out in general terms the utility of the invention. If possible, the nature and gist of the invention or the inventive concept should be set forth. Objects of the invention should be treated briefly and only to the extent that they contribute to an understanding of the invention.

(h) Brief Description of the Several Views of the Drawing(s): See MPEP § 608.01(f). A reference to and brief description of the drawing(s) as set forth in 37 CFR 1.74.

(i) Detailed Description of the Invention: See MPEP § 608.01(g). A description of the preferred embodiment(s) of the invention as required in 37 CFR 1.71. The description should be as short and specific as is necessary to describe the invention adequately and accurately. Where elements or groups of elements, compounds, and processes, which are conventional and generally widely known in the field of the invention described and their exact nature or type is not necessary for an understanding and use of the invention by a person skilled in the art, they should not be described in detail. However, where particularly complicated subject matter is involved or where the elements, compounds, or processes may not be commonly or widely known in the field, the specification should refer to another patent or readily available publication which adequately describes the subject matter.

(j) Claim or Claims: See 37 CFR 1.75 and MPEP § 608.01(m). The claim or claims must commence on separate sheet or electronic page (37 CFR 1.52(b)(3)). Where a claim sets forth a plurality of elements or steps, each element or step of the claim should be separated by a line indentation. There may be plural indentations to further segregate subcombinations or related steps. See 37 CFR 1.75 and MPEP § 608.01(i)-(p).

(k) Abstract of the Disclosure: See MPEP § 608.01(f). A brief narrative of the disclosure as a whole in a single paragraph of 150 words or less commencing on a separate sheet following the claims. In an international application which has entered the national stage (37 CFR 1.491(b)), the applicant need not submit an abstract commencing on a separate sheet if an abstract was published with the international application under PCT Article 21. The abstract that appears on the cover page of the pamphlet published by the International Bureau (IB) of the World Intellectual Property Organization (WIPO) is the abstract that will be used by the USPTO. See MPEP § 1893.03(e).

(l) Sequence Listing, See 37 CFR 1.821-1.825 and MPEP §§ 2421-2431. The requirement for a sequence listing applies to all sequences disclosed in a given application, whether the sequences are claimed or not. See MPEP § 2421.02.

Appropriate correction is required.

Claim Objections

3. Claims 1-11 are objected to because of the following informalities: Examiner requests the applicant remove the reference characters from the claims. Examiner has taken the liberty and deleted them when doing analysis below. While the removal of reference characters is not required, the examiner requests that if applicant desires to keep the reference characters, that the applicant check to make sure the reference characters correspond to the elements recited in the detailed description and drawings. Appropriate correction is required.

4. Claims 3, 4, 6, and 8 are objected to because of the following informalities: The above listed claims recite elements using the language "and/or," "preferably," and "optionally." The examiner requests that applicant correct the above claims to positively establish if the claim is limited by the element so to avoid the claim being indefinite under 35 U.S.C. 112 2nd paragraph. For the purposes of prosecution, the examiner takes the position that he can establish the metes and bounds of the above listed claims and will treat the above language as alternative language and non-limiting. However, the examiner does request that applicant make corrections to the claims to lessen the chance of confusion in the future.

Double Patenting

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. Claims 1 and 11 are provisionally rejected on the grounds of nonstatutory obviousness-type double-patenting as being unpatentable over Claim 12 of copending Application, U.S. Patent Application No. 20060262966 A1 (hereafter USPGPUB '2966) in view of Kenet.

This is a provisional obviousness-type double patenting rejection.

7. Regarding Claim 1 of the present application, Claim 1 of USPGPUB '2966 recites an object located in a path network, a map image of the path network, a determination that the map image belongs to the path network, calculation of a transformation that brings the object and path network into register, and superimposing the map image in whole or in sections on the current image. Claim 1 herein differs from Claim 1 of USPGPUB '2966 in that it includes segmenting of the images to improve processing for registration.

Kenet discloses segmenting of medical images to improve processing (Col.15, Lines 16-43).

Kenet suggests using segmentation in imaging so that regions representing artifact or interfering structures may be eliminated and only regions of interest may be analyzed (Col.15 Lines 16-27). Further, Kenet applies segmentation to in vivo imaging (Col.15, Lines 28-30) and while Kenet's exemplary embodiment focus' on human cutaneous surface in vivo, the specification as a whole contemplates the invention being used with in vivo vascular procedures (Col.3, Lines 31-43).

Claim 11 is rejected for the same analysis as stated in claim 1 because it is a method claim directly corresponds to the apparatus claim 1.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Packer et al (U.S. Patent No. 6,556,695 B1, hereafter "Packer") and in further view of Kenet et al (U.S. Patent No. 5,016,173, hereafter "Kenet").

10. Regarding Claim 1, Packer discloses a device for combined display of a current image of an object, which is located in a path network (Col.8, Lines 47-50 and Col.9 21-24; taking the broadest reasonable interpretation of the claim, a path network may include a vascular system), and a map image of the path network (Col.9, Lines 37-52), the device containing a data-processing system that is arranged

a) in a map image to identify the path network… (Col.9, Lines 37-52);

b) to calculate from the segmentation result auxiliary information and archive it in the memory of the data-processing system, from which a transformation that brings the

object and path network into register can be determined in real time for every possible position of an object in the image (Col.9,Lines 53-67 and Col.10, Lines 1-9);

d) using the auxiliary information, to determine transformations of the map image and of the current image, so that, when the transformed map image is superimposed on the transformed current image, the image of the object comes to lie in the path network of the transformed map image (Col.9, Lines 59-67 and Col.10, Lines 1-5 and 31-36).

Packer fails to disclose:

…by segmentation…

…c) from the current image to segment a relevant object that is located in the path network… .

Kenet discloses:

…by segmentation… (Col.15, Lines 16-43).

…c) from the current image to segment a relevant object that is located in the path network… (Col.15, Lines 16-43).

Kenet suggests using segmentation in imaging so that regions representing artifact or interfering structures may be eliminated and only regions of interest may be analyzed (Col.15 Lines 16-27). Further, Kenet applies segmentation to in vivo imaging (Col.15, Lines 28-30) and while Kenet's exemplary embodiment focus' on human cutaneous surface in vivo, the specification as a whole contemplates the invention being used with in vivo vascular procedures (Col.3, Lines 31-43).

One of ordinary skill in the art would look to the prior art for suggestions on how to make improvements to the registration of medical imaging, including those methods

that include vascular imaging. Therefore, motivation to combine may be gleaned from the prior art contemplated. One of ordinary skill in the art at the time of invention would have found it obvious to modify with a reasonable expectation of success the Packer reference with the Kenet reference to achieve using segmentation in the registration of a real-time image.

11. Claims 2, 4-8 and 10 depend upon Claim 1, therefore the rejection of Claim 1 is incorporated into the rejections of Claims 2, 4-8, and 10 and only further limitations will be addressed below.

12. Regarding Claim 2, Packer discloses a device as claimed in claim 1, characterized in that the auxiliary information includes a distance image in relation to the path network, which is obtained from the particular map image by a distance transformation (Col.9, Lines 53-67 and Col.10, Lines 1-8; taking the broadest reasonable interpretation of the above claim, the distance image can be interpreted as being a type of function that outputs the likelihood of registration between the map image and the object image. Further, the applicants own specification suggests the distance image is only used for estimating the position of the object in relation to the map image and is never displayed (Page 6, Lines 21-23). This suggests the distance image does not have to be an actual 'image' but only an estimation tool. Therefore, the prior art anticipates the distance image as claimed herein by calculating a cost function in matching the stored map image to the object image when registering).

13. Claim 3 depends upon Claim 2, therefore the rejection of Claim 2 is incorporated into the rejection of Claim 3 and only further limitations will be addressed below.

14. Regarding Claim 3, Packer discloses a device as claimed in claim 2, characterized in that the data-processing system is arranged

b1) to determine the position of the image of the object in the current image (Col.9, Lines 27-29; the prior art discloses processing the real-time image into a form that can be best used in the registration process, thus it is inherent that to prepare the real-time image for registration the object position would necessarily be determined so as to best determine around what points to focus the registration, i.e. if the object is near a heart wall, to best register the image it is inherent that you would detect the position of the object near the heart wall and use heart wall points for registration).

c1) for the position corresponding thereto in the distance image, to determine the shortest displacement leading into the path network (Col.9, Lines 53-67 and Col.10, Lines 1-8);

c2) to identify a transformation of the map image and/or of the current image that includes the determined displacement (Col.9, Lines 53-67 and Col.10, Lines 1-8).

15. Regarding Claim 4, Packer discloses a device as claimed in claim 1, characterized in that the determined transformations include a translation, a rotation and/or a scaling (Col.9, Lines 53-67 and Col.10, Lines 1-8).

16. Regarding Claim 5, Packer discloses a device as claimed in claim 1, characterized in that the data-processing system is arranged… to assign to each pixel a probability that it belongs to the network (Col.9, Lines 59-67 and Col.10, Lines 1-5).

Packer fails to disclose …during segmentation of the path network in the map image…

Kenet discloses …during segmentation of the path network in the map image… (Col.15, Lines 16-43).

Kenet suggests using segmentation in imaging so that regions representing artifact or interfering structures may be eliminated and only regions of interest may be analyzed (Col.15 Lines 16-27). Further, Kenet applies segmentation to in vivo imaging (Col.15, Lines 28-30) and while Kenet's exemplary embodiment focus' on human cutaneous surface in vivo, the specification as a whole contemplates the invention being used with in vivo vascular procedures (Col.3, Lines 31-43).

One of ordinary skill in the art would look to the prior art for suggestions on how to make improvements to the registration of medical imaging, including those methods that include vascular imaging. Therefore, motivation to combine may be gleaned from the prior art contemplated. One of ordinary skill in the art at the time of invention would have found it obvious to modify with a reasonable expectation of success the Packer reference with the Kenet reference to achieve using segmentation in the registration of a real-time image.

17. Regarding Claim 6, Packer discloses a device as claimed in claim 1, characterized in that it comprises an imaging arrangement, especially an X-ray apparatus and/or an MRI apparatus, for recording the current image and optionally the map image (Col.10, Lines 31-36 and 48-52).

18. Regarding Claim 7, Packer discloses device as claimed in claim 1, characterized in that it comprises a memory for storing a number of map images, which are categorized according to a varying state of the path network (Col.9, Lines 42-52).

19. Regarding Claim 8, Packer discloses device as claimed in claim 1, characterized in that it comprises a sensor device for detecting at least one parameter that describes a varying state of the path network, preferably for detecting an electrocardiogram and/or the respiratory cycle (Col.9, Lines 5-23).

20. Claim 9 depends upon Claim 6, therefore the rejection of Claim 6 is incorporated into the rejection of Claim 9 and only further limitations will be addressed below.

21. Regarding Claim 9, Packer discloses a device as claimed in claim 6, characterized in that the data-processing system is arranged to select from the memory a map image of which the associated state of the path network is the best possible match for the state of the path network during the current recording (Col.9, Lines 59-67 and Col.10, Lines 1-5).

22. Regarding Claim 10, Packer discloses a device as claimed in claim 1, characterized in that it contains a display device and the data-processing system is arranged to display on the display device the transformed map image superimposed entirely or in sections on the transformed current image or a section thereof (Col.10, Lines 31-36).

23. Regarding Claim 11, Claim 11 is a method claim corresponding to apparatus Claim 1, therefore, Claim 11 has been analyzed and rejected with respect to Claim 1.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to STEPHEN KOPCHIK whose telephone number is (571)270-7117. The examiner can normally be reached on Monday-Thursday 9:30 AM - 6 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vu Le can be reached on (571) 272-7332. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/STEPHEN KOPCHIK/
Examiner, Art Unit 4154

/Vu Le/
Supervisory Patent Examiner, Art Unit 4154